things and brings in the physiology of the germ or heredity, which it requires an effort of the mind to associate with physiology at all. With so novel an outlook and so enlarged a sphere, it is impossible that everything should be exact and beyond argument; much must remain for a time uncertain, and theories will abound, and do abound, within the cover of this book. For example, the statement that the normal new-born infant is in a condition resembling acidosis is not by any means secure against attack, as a research by Sehom, made so recently as 1919, shows.

Dr. Feldman does not claim to carry over into pathology the ideas which this widened outlook of physiology suggests, and yet indirectly disease and the abnormal are recognised as lying just below the horizon in almost every part. Thus the peculiarities of the fœtal circulation underlie every statement which one can make regarding congenital heart disease. And the converse is also true, for the fact that the fœtal heart beats before and even at birth in a fœtus possessing neither brain nor spinal cord throws light upon the physiology of cardiac action before birth, and suggests that its rhythm is myogenic, and not neurogenic, in origin. Interesting notions spring up on every page, and the reader can scarcely escape the stimulation to think out for himself their application to all sorts of phenomena. One is well accustomed to apply physiology to the clarification of the diseases of adult tissues and organs; but a certain degree of novelty attaches to the effort to look at the pathological occurrences in the new-born infant in the light supplied by the special conditions of ante-natal physiology. For example, the umbilicus is, so to say, the "one portal" by which all things (food supplies, oxygen for respiration, and the germs of disease and toxic substances) reach the unborn infant—it lives through its umbilicus, and it may die by its umbilicus—and after birth, whilst it is no longer nourished by the navel, it may yet for a time be infected through it, as in cases of septic mischief round the root of the cord stump. Most text-books speak with an uncertain sound regarding the diseases peculiar to the new-born infant—the neonatal maladies, as they are called; it will ere long be found that much which is inexplicable in their characters and causation is made plain by the study of ante-natal physiology as it is affected by the impact of birth-traumatism.

The book is abundantly illustrated and admirably arranged, and the author is particularly happy in his choice of the quotations with which he ushers in each chapter. For instance, what a range of thought along novel lines is brought before the reader's mind by Samuel Butler's paradoxical truth with which the work begins: "Birth . . . is commonly considered as the point at which we begin to live. More truly it is the point at which we leave off knowing how to live." One is tempted to turn away from the thought as, in a sense, mental somersaulting; but if one resists this inclination and looks fairly and wholly at it, one sees that Nature's ante-natal provision for the well-being of the unborn child is as near perfection as can be imagined. The fœtus, so to say, knows how to live. Birth comes as the jolt due to the changing of the gearing, and it is some time before the new-born infant, with all the aid that doctor, nurse, and mother can give him, can be said to be in harmony with his environment.

We should like to follow out other lines of thought suggested by this volume, such as His's dictum: "The ultimate aim of embryology is the mathematical derivation of the adult from the distribution of growth in the germ"; but enough has been said to send the interested reader to the book itself, where he will find fertile fields for the intellect to water and in due season to reap.

J. W. B.

Forest Research.

The Fungal Diseases of the Common Larch. By W. E. Hiley. Pp. xi+204. (Oxford: At the Clarendon Press, 1919.) Price 12*s.* 6*d.* net.

THIS volume is the most important contribution to the scientific literature of forestry that has been made for some years. Mr. Hiley was well advised to select the larch as the subject of his first investigation as Research Officer in the School of Forestry in Oxford, for it is in many respects the most important species of tree that is cultivated in this country. Moreover, it is a tree the health of which has given much concern to foresters and others for many years past.

After an introductory chapter on the general relationships of host and parasite, and on the morphology of the larch, Mr. Hiley proceeds to deal with the larch disease, or larch canker in the specific sense of the term. This is due to the attack of a Discomycetous fungus, which is usually known in this country under the name of *Dasyscypha calycina*. The author does well to remind us that M. J. Berkeley was the first to recognise the fungal character of this disease, although the work of Willkomm and of Robert Hartig is more frequently cited. Hartig, followed by Massee, believed that infection could take place only through a wound, and it must be said that there is much observational and experimental evi-

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dence in support of this contention. Probably the most interesting section of Mr. Hiley's volume is that in which he supports and elaborates the view that in the great majority of cases the stem of a larch is infected by the mycelium of *D. calycina* which is living saprophytically on the dead branches. This theory is not new, but it has never before been subjected to so critical an examination. It is a matter of common observation that a branch springs from the centre of a canker, and it had generally been assumed that death of the branch followed invasion of the stem. But Mr. Hiley now produces evidence which seems to prove beyond reasonable doubt that the branch has always died before the canker has originated, and, in fact, that the dead branch, serving as food for the fungus living saprophytically, has been the vehicle of infection. Such infection always takes place between the end of one growing season and the beginning of the next, consequently the last wood ring in the centre of a canker spot on a stem is always completely formed.

Another parasite of the larch which receives exhaustive treatment in the volume is *Fomes annosus,* the common cause of heart-rot. Unlike *D. calycina,* it is equally common on other conifers, and in the aggregate does a great deal of damage. The same may be said about *Armillaria mellea,* perhaps the most destructive single fungus species with which the forester has to contend.

The more important leaf and seedling parasites are also reviewed, the volume finishing with an interesting general summary and with a useful bibliography. More than seventy illustrations add greatly to the value of the treatise, which is indispensable alike to the mycologist and the forester.

The Absorption of Light by Organic Compounds.

Etudes de Photochimie. By Dr. Victor Henri. Pp. vii+218. (Paris: Gauthier-Villars et Cie, 1919.)

THIS monograph is the first instalment of a series in which are to be presented the results of several years of work of the author and his collaborators. From 1908 to the outbreak of war Dr. Henri devoted his attention to the experimental study of various chemical aspects of the interaction between radiation and matter, dealing chiefly with the absorption of light in the infra-red and ultra-violet regions, with dispersion in the ultra-violet, with chemical reactions brought about by light, and with certain technical and biological aspects of the subject. In 1915 he went to Russia to help in scientific work in connection with the war, and towards the end of 1917 began to work up the mass of data accumulated in preceding years. Very few of his results had been published separately—papers by Bielecki, Boll, and Wurmser will, however, be familiar to workers in this field.

The present volume essentially contains the results of the author's work on absorption and dispersion, and is of considerable interest. Employing a photographic method, carefully checked, and using a powerful source of ultra-violet light, worked out by himself and giving a continuous spectrum, he was able to measure *quantitatively* the exact form of the absorption curve in the ultra-violet for about 240 organic compounds. As he points out, this represents a very considerable advance, previous work being confined to the mere investigation of the positions of the bands. To these measurements are added a series of determinations of dispersion in the ultra-violet, employing a specially designed apparatus, and a number of absorption measurements in the infra-red. The application of formulæ developed by Helmholtz and Ketteler, Drude, Lorentz, etc., has enabled him to draw conclusions as to the nature of the oscillators responsible for the absorption of light of different wave-lengths, the damping (usually very great) to which such oscillators are subjected, etc.

The more important results are as follows: (*a*) The oscillators absorbing in the infra-red are of molecular size, are atoms or fractions of atoms in the mean ultra-violet, and electrons in the extreme ultra-violet. (*b*) These different oscillator systems are closely bound up with one another, and there exist simple numerical relations between the infra-red frequency due to a chromophore and the ultra-violet frequencies in molecules containing such a chromophore. This, of course, was previously discovered by Baly, to whose work adequate reference is not made by the author. (*c*) By the application of simple rules, the absorption spectrum of a compound can be calculated with considerable accuracy from its constitution and the characteristic infra-red frequencies of the chromophores, two simple constants for each infra-red absorption band being necessary. (*d*) The structure of a molecule is essentially *mobile*. The existence of ultra-violet absorption bands is an index of a labile and reactive state. This, again, is in agreement with Baly's views.

Other more speculative conclusions are perhaps less justified. The experimental work appears to be of a high order, and the other volumes promised will be looked for with interest.

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